

Point of No Return!



This was a 212 ferry flight. I was several days into this trip to deliver the aircraft from the States to its new owner in South America. The days leading up to this particular flight were full of challenges that were not making things any easier. For instance, before I got to the Mexican border I had a maintenance problem with the combining gearbox. It took a day to iron that out. Then to cross the border I had to deal with unexpected issues concerning an export license - another problem that I was unprepared for. With that resolved, I pressed on, flying south through Mexico. Throughout the trip I faced one administrative or logistic problem after another. The kind of problems that none of my previous aviation training or experience helped to solve. I had to think on my feet and invent solutions to unique (to me) problems. Instead of taking four days as planned, it took ten days to reach my destination - Bogota, Colombia.

The general route for this trip was through Mexico, Central America, and down into South America. All of this was intended to be overland, with none of it over any significant

bodies of water.

Several legs of this trip gave me experiences that I will never forget; but this particular one was the most notable. I was to fly from David, a city near the western border of Panama, to Panama City the capital. For those of you who have never been there, the country of Panama is shaped like a thin,

stretched-out "S" that runs generally east and west. The north side faces the Caribbean Sea, and the south side faces the Pacific Ocean. I am certain that at one point in this flight I was able to see the Caribbean to my left, and the Pacific to my right. A spine of mountains runs the length of the country with the exception of the gap where the Panama Canal comes through. Just north of David a peak



exceeds 11,000 feet, but the chain that runs toward Panama City is much lower than that.

My aircraft had only the basic fuel tanks. No ferry tanks, nor any extra fuel-cans carried aboard. This was a long leg for this fuel capacity, and I knew it. I knew it so much that on fuelling at David I used a ground-handling wheel assembly to lean the aircraft over so I could get every last drop that would fit into the tank. My plan was to fly the shortest route, direct from David to Panama City. That would have me crossing and paralleling the mountains almost all the way.

At David I could not get a very good weather forecast. I knew what the weather was at David and the local area, and at the Panama City destination, but I couldn't get any weather for points in between. Off I went VFR. To cross the mountains I had to climb. Up, up, up. I got on top of a scattered cloud layer. Like all good war stories, that layer slowly turned to broken, and then to a solid undercast. I could see mountain peaks here and there sticking through the clouds - none of which offered a place to land if one wanted to do so.

By the way, did I mention that I was solo. No copilot, mechanic or passenger. This was also the first time I had flown in this part of the world. In addition, I don't speak Spanish. Being English-only was not a big problem, but if I could have spoken Spanish it would have made things easier.

I was now past the point of no return - not enough gas to

get back to David. That option was gone, so there was no decision to make - continue as planned.

I tried to talk to someone on the radio - couldn't raise anybody. Probably too far away.

The VFR-on-top was now turning into VFR-in-between. The lower and upper cloud layers merged in the distance. I was in the clear, but I did not have a horizon. Things were not looking good, and I was not exactly relaxed. None of my nav aids were giving me any good information - even the GPS was erratic. I was essential-



ly solid IMC, couldn't see the mountain peaks below me, talk to anyone on the radio, and had no reliable nav aids! I was back to the very basics of flying compass and clock. It was then that I swore that I would never do this (alone) again!

Like all stories with a good "happily-ever-after" ending, I happened across a hole in the clouds. I zoomed down, past the mountains, and could see the coastline ahead. To stay VFR I had to go out over the water - this was the Pacific side. I could see the surface, but the visibility inland was shrouded in clouds and rain. I still was unsure of my position. I tuned in the VOR, which was a fix for

an approach into my destination airport - the major International Airport in Panama City. I headed direct to the VOR, but the rain started and quickly intensified into a downpour. I slowed my airspeed, and got down to about 50 feet over the water. The VOR transmitter was located on a small island covered with trees. I flew directly to it. No place there to land. I was down to a very low fuel state and had to get it on the ground soon. (This aircraft had no flotation gear, and I had no life vest or life raft) Still over water, I headed for my destination field. It was IFR and they would not let me in VFR. There was another airport about 7 miles away. I entered the new field coordinates in my GPS and headed direct. I called them and told them I was at minimum fuel state and had to land immediately. My intention was to land at that field whether they cleared me or not. I did not care what would happen.

They cleared me immediately. I was still plowing low and slow through the heavy rain - 50 feet and 50 knots. I was flying to my GPS destination. The rain was so heavy that I never noticed when I crossed the shoreline. Incredibly I didn't see the runway until I was directly over it. I landed in the grass. I couldn't see the tower, but I radioed them to let them know that that I was going to shut down until the rain passed."

Our thanks to another reader for contributing this harrowing tale. Certainly every aviator can understand the seriousness of his situation, and appreciate his efforts to get himself out of his own trap and land safely. But what are the lessons

learned for those of us who read this from the comfort and safety of our homes or offices.

Here are a few to consider.

Resignation. An attitude that has no place in the cockpit. This is one of the five deadly attitudes. Obviously you the pilot simply cannot throw up your hands and give up. You can't give up – lives, including your own, depend on your action. Even if you are not quite certain, keep trying – you might find the right thing. If there are no other options, keep heading towards your target, even though the outcome is uncertain. But, be flexible – don't get target fixation – another solution may come up.

This pilot never gave up. He faced several difficult situations, but he continued to cope with these problems until he found an answer.

Innovation. This was certainly not the first pilot on a VFR flight to put himself in or over the clouds, have the good fortune to find a "hole," and then come up with the brilliant idea to spiral down so as to be able to resume flying via reference to the surface of the earth again. Nor was he the first to find himself in rain so heavy that he elected (was forced) to descend to tree-top height and slow down to avoid running into an obstacle. He was also like many other pilots who have had to rely on compass and clock for backup or normal navigation. And certainly he will not be the last pilot to be out over water with a low fuel state and be lucky enough to reach the only field available before fuel starvation. Sure, lots of today's pilots find themselves in the same deadly predicaments that pilots experienced decades ago. And the solutions are essentially identical – nothing innovative. Same old ways out of the same old killer traps.

But for those who have not yet wrestled with any of these prob-

lems, the first time you do, it will be new to you, and you will have to be innovative. If you have never practiced or performed any of these miracles that have saved the lives of many a previous aviator, you will feel that you have just invented something entirely new. For instance, if your first engine failure occurs over unprepared terrain, it will be your first time to shoot an autorotation to a rocky slope or a cornfield – nothing at all like the simulated engine failure/autorotations practiced to a nice long, smooth runway.

Granted, you may be the first aviator to have the bad fortune to experience something no one else had ever seen or even thought of doing – a truly unique and unusual situation. This will demand your innovation. You might be forced to invent a new solution. After all, you don't learn everything in flight training. Your Flight Manual, or company Flight Operating Procedures, or Federal Air Regulations don't give you the answers for everything.

Assertiveness. This pilot finally decided that "My intention was to land at that field whether they cleared me or not. I did not care what would happen." In this story the pilot was not given clearance to land at his destination airport. The field was IFR, and the standard procedure is to restrict VFR traffic. The pilot accepted the denied clearance and quickly selected an alternate airfield; but in this case he was prepared to land, clearance or not. This situation tends to fit the most common perception of assertiveness – where a subordinate finally stands up to a demanding superior. Sure it happens often enough that a boss forces a pilot to fly an aircraft or conduct a mission against his wishes.

However, assertiveness need not always be a subordinate dealing

with a superior. Sometime you simply need to be assertive with yourself. You must choose where and when to "Land as soon as possible" after you experience that engine chip light. You must decide to write up that overtorque you experienced getting out of that confined area. You must decide to abort a mission when the weather gets too bad. Assertiveness is taking action when it is required.

Give yourself an Option.

Don't paint yourself into a corner. Flying has enough risk all by itself. You certainly don't need to increase the risk by limiting your alternatives, especially when you limit yourself to only one acceptable answer. This pilot got himself to a point where there was only one acceptable choice left. If he didn't make it to the alternate airport he would have flamed out at a low height, with little forward visibility, over water or terrain of unknown substance. Sometimes the choices are limited, and neither one is all that desirable.

Consider this situation. You want to fly to a destination on the other side of a mountain range. A road leads over the mountains and through a pass toward your destination. The mountain tops are covered by clouds, with low visibility and rain in the pass. The weather on the other side of the mountains is OK.

Is it better to fly low and slow following the road; or climb up and over the clouds? Either one can limit your options if something else occurs. Going Inadvertent IMC in the mountain pass would be tight, just as would having a forced landing from above the cloud covered mountains. Some might say neither is acceptable.

Take whatever lessons you wish out of this story. Perhaps what you learn will help you never to pass your Point-of-no-return.



There I Was...



Here are some accounts sent to us by readers.

Juneau Ridgeline

"I was working out of Juneau, Alaska carrying construction workers to a ridgeline for the building of a tram. I'd been up there many times over a period of several months. It was always the same. VFR work carrying men and the supplies and equipment we could handle in our helicopters. It was a bit monotonous carrying these workers and their stuff from a sea level airport up to one of only a few landing sites on the ridgeline. This particular construction site was in a saddle with higher ridgelines on either side. This morning one construction crew member asked me if there would be any problem getting up to the ridgeline. He was looking at the weather. Clouds on top of the ridgeline, but the saddle was still clear. Yes, of course. If I could see it, we could get there. Took off and made a long loop so that I could fly diagonally up the steep, rocky slope. I could not have flown straight up the slope – it was too steep. It got cloudier, and cloudier, and I made it to the ridge. I landed and disembarked the passengers. When I was ready to takeoff I looked out and down, and all I could see was cloud. I sat there for a while to figure out how I was going to get back down. I decided I could do the opposite of what I did flying up. The plan was to fly close to the slope, keeping it to my right side as I

descended. Off I went. I couldn't see anything in the direction the helicopter was pointed and moving. I had to look out the right side to see the face of the mountain to determine my ground speed (which was very slow) and verify that I was indeed descending. This wasn't working so well. I didn't like what was happening, but I couldn't turn around or back up in reverse to get back to the ridgeline landing spot. I was in a tough spot. So I came to a stop and stayed in a hover for a while. I knew there were no obstacles straight away from the downslope, but it was solid cloud that way. I figured I had no other choice. I did a pedal turn and flew downslope with terror. In just a moment, before I could develop a scan and transition to the instruments I broke out of the clouds."

Tail Rotor

"I was about 500 feet AGL, maybe 90 knots. Four passengers in a 206B. None of the positions had shoulder straps. At the time I had way less than 400 hours total time, most of which was in Robinson R-22's and R-44's. I took my basic flight training in Robbies. I had also recently taken the factory training for the 206B. The emergency procedures training in the Robbies was similar to that in the 206B.

In cruise flight I heard a loud bang and an airframe shudder. Collective down. Nose down slightly. Had a spot to land in sight. Began a right 180 degree turn. I knew right away that it was a tail rotor failure.

Moved the pedals and there was no response. In descent told passengers emergency landing. Landing field and spot selected. Terrain is clear grassy field, slight downslope. Flared. Throttle to flight idle. Leveled the nose. Touched down flat with about 30 knots and a slight yaw. Everything smooth and OK until right skid cross tubes failed. Rotor blades hit the ground. Lots of shaking and shuddering. Aircraft lying on its right side. Nobody was hurt. Passengers were all calm. Assisted passenger in the left cockpit seat to release seatbelt and fall to his feet, and then out the door. I climbed into the cabin and helped a lady get out of the left (top) door. Other than to quickly say to the passengers that this was an emergency landing there was no time to think and plan and talk. There was only enough time to react."

Oil Pipeline Inspection

"Steel pipes buried under the surface, stretching for hundreds of kilometers to carry oil, petrol, gasoline, etc. The company owning it checks the line regularly using a JetRanger with a pilot and two of their personnel – one from the head office, and the second one sitting in the back, responsible for particular section.

It was a pleasure to do that pipeline inspection as everything was well organized in small details. Fuel drums properly stored, checked, positioned; stops with home-made snacks at the pumping stations; hotels for night stops. But the best was the whole crew cooperation during the flight.

Helicopter flew on the left hand side of the line marked with short, white poles, approxi-

mately 60 km/hr at 10—15 meters above the ground. Each kilometer of the pipeline had separate page in special notebook held by the guy sitting next to me with all electrical, telephone wires, possible obstacles, previous damages to the line, etc., marked. He was calling it at the beginning of each kilometer and verifying pilot response. One of the best-organized helicopter jobs I did.

During breaks and night-stops I heard quite a lot about pilots who already left the company, their mishaps with the wires, attempts to fly under the big bridge close to the line, bad weather forcing them to land on the line, etc. I wanted to be on the safe side – job was being done not for my pleasure but for the customer.

One section of the line in a shallow valley had been exposed after heavy rain and we were to verify the progress of the ground team covering the pipe with concrete and stones. It was nice, warm day and approaching the spot I planned to get there slow and low but without blowing sand into the air and at the working team. As long as I kept moving, I was safe and although I had climb out having slopes on my three sides and a small railway bridge on the fourth – it looked OK. During circling the spot I checked the power and it was not as great as I wanted it to be – but still acceptable. We waved at each other, made a lowest pass and accelerating the chopper I chose another option for climbout. I should rather say: I executed an option which never came into my mind before. I simply visually checked the width of the railway bridge spans, selected the left one without any bushes

and flew under it! When the inspector sitting in the front seat realized my intention he wanted to pull out his camera to take a shot, but everything happened too fast. I did not hear a word of protest before or after, but deep in myself, I did not feel any satisfaction either. Rather disappointment: "and you wanted to be a safe pilot, didn't you?"

What gave me the biggest surprise was the coolness I executed the maneuver with, and the total lack of planning. No consideration for falling pieces of concrete stones, hanging wires or even for my passengers! I was the one in charge and I did not ask them if they were happy to "share" it with me. Neither the ground team nor passengers reported that event to my boss. No consequences. It happened several years ago. Even now I do not want other fellow pilots to know about it. Definitely not worth it."

I'll Land in your Yard

"I offered to take a buddy for a ride in my Brantley B2B. He said there was a clearing in his yard where I could land that was plenty big, but surrounded by tall pine trees. The confined area landing was tighter than I expected from his description but it looked usable since it was a fairly cool day and I had burned off some of my fuel load. I looked around and up after I landed and started to wonder why I did

what I had just done. He hopped into the passenger seat and was ready to go before I could cool off and shut down.

We took off in a steep climb and little forward motion to clear the 50 foot high trees. Just as I got close to the bloom area at the top of the tree it seemed like a branch that I had been watching was standing still. Climbing at full power had ceased and a quick glance at the rotor tach indicated that RPM was decaying. There was no time or room to turn around so I lowered the collective to get some power back and flew down and backwards to my takeoff spot and an uneventful landing. I turned to my friend and said "Well it looks like it isn't going to make it, so hop out and I'll pick you up in the big field across the street where we have more room!"

I know that my friend never realized the amount of danger we were in and all I had to do to avoid it in the first place was land in the clear lot that was maybe 50 yards away. I felt like a heel about this for a long time and I've never let a passenger's opinion or desires distort my judgment since then."



YOUR ANSWERS.

In our last issue we asked "If you are in a situation where you must get the most distance from the fuel on board, how do you determine your max range airspeed?"



Human AD.

We received few responses to this question. Not certain why. I don't believe it was too simple a question, because those I asked verbally were not quick with an answer.

The majority of the responses we received can be summarized in this one answer:

"I look it up in my Robinson Manual which states "100K Max Fuel Range."



The following enlightening answer came from a Senior Experimental Test Pilot.

"Technically speaking, for a no-wind condition, the max range airspeed is the tangent point of a line drawn from the origin, tangent to the speed-power curve.

The speed-power curve is a function of aircraft drag. Additional drag must be accounted for when external equipment is installed on an aircraft. Some examples of additional drag are pop-out floats, high landing gear, passenger steps, fuel range extender, night sun, loud hailer, and certain antennas. For this reason each aircraft has a unique speed-power curve which is dependent

on its configuration.

To determine the speed-power curve for your aircraft you need to fly in very calm air with no thermals. Early morning is usually best for this test. Fly the aircraft in level flight at 40% torque for about a minute. Verify level flight by noting no change in altitude during this test point. Do not use the VSI to confirm level flight because it is not as accurate as the altimeter. Record the level flight indicated airspeed. Repeat this process in 5% torque increments up to 85% torque.

On graph paper plot indicated airspeed along the horizontal axis and indicated torque on the vertical axis. The 10 data points generated by the tests above represent the speed-power curve for this aircraft. From the point on the graph representing zero airspeed- zero torque draw a line tangent to the curve. The tangent point is the best range airspeed for this aircraft with no headwind or tailwind.

Aircraft gross weight has an affect on the speed-power curve. I suggest that if you are going to make only one curve you pick a mid-gross weight for this test.

Once you know the max range airspeed for your aircraft there are a couple of rules of thumb you can use to help get the most distance from the fuel on board. To estimate your max range indicated airspeed

with winds try this: If you have a headwind add one-half the headwind component to the "no-wind" max range airspeed. If you have a tailwind, subtract one-half the tailwind component from the "no-wind" max range airspeed. The reason to make the adjustment is because when you have a good tailwind it is to your advantage to fly a little slower but gain distance by remaining airborne for a longer period of time. The reverse applies to a headwind.

The greatest gain for stretching your range is to go to a higher altitude. Best range airspeed is an indicated airspeed. As you climb this indicated airspeed will become a much faster true airspeed. Most helicopters do significantly better at 7,000 feet than they do at sea level.

An interesting footnote: If you make a speed-power curve starting at 30 knots you will see that the curve is concave upward. The low point of the curve is an important area called the "bucket." This is the minimum power to maintain level flight, typically about 55 knots. Airspeeds slower or faster than the "bucket" airspeed





require more power. The "bucket" airspeed, corrected for climb and descent errors is the indicated airspeed to achieve best rate of climb and minimum rate of descent.

Unfortunately there is no short answer to your question, but if a pilot wanted to invest a little work he could get the answer for his aircraft by following the above instructions."



Thanks. If you were uncertain about your answer to this question, these two answers should be all the guidance you need to determine what the max range no-wind airspeed is for your aircraft. If you take the time, you can perform the tests described above to determine the max range airspeed for your aircraft. In addition, your Flight Manual may have the performance data that identifies max range no-wind airspeed. That performance data may not be in your basic Flight Manual Performance Section. You may find it in the Manufacturer's Data Section.

This is all well and good, but if you have not developed or found this information ahead of time you cannot determine or find it when you are alone and busy in an anxious cockpit. Do this thinking ahead

of time. One other important lesson here is that wind affects all range numbers. Max range airspeed increases in a head-wind and decreases in a tail wind. It will not however decrease below the "bucket" airspeed.

So, when you get in that tight spot where the heavy

rain/fog/low visibility forces you to descend to be able to maintain visual reference with the surface, and there is the accompanying pressure to decelerate to a very slow air-speed, you should recognize that you are not maximizing your range. If range is critical, here is when you earn that flight pay when you are forced to fly faster and risk hitting an obstacle; or fly slower and risk a flameout before reaching your destination.

Here are a couple more answers to questions from the past. In the next issue we will finish up with the remainder of interesting answers to the "... have you done something stupid?" question.



Model 500

"I was flying back alone in my 500 Model from Acapulco Mexico to Van Nuys, California. The outside air temperature at the surface was over 100 degrees F. Between "required" fuel stops/check points, fatigue set in. I almost fell asleep and had to land on a beach. The locals were fine, but the local authority at my next destination was less than hospitable. I had a lot of explaining to do."



Dancing.

Many years ago (I was 19 years old) I would spend the majority of my weekends dancing to the wee hours of the morning. Although I enjoyed partying, I refrained from any alcohol. Returning home at 5:00 a.m. one morning my phone was ringing. The first question was "Had I been drinking?" The second was "How soon could I get to the hangar?" There was a derailment about 150 miles north of our base and I flew almost 16 hours that day (this was a couple of decades ago). On the last flight home through a narrow mountain pass, the clouds quite low, I mentioned to my passengers to keep an eye on me as I was extremely tired. I remember waking with a start with some big rock-face not too far in front of me. It wasn't too close, so I started a gentle turn with my heart racing. I took a quick glance over to my passenger, snoring away, oblivious to our close call.

You would think I would learn, but on my fourth night of all night medevacs a few years later I recall being glad I was wearing a helmet because when I nodded off the weight of the helmet gave me such a jerk it woke me right up.

I can assure you that now I make sure I have adequate rest before every shift."



[illegible]



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